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ABSTRACT

The current plateau in the use of computers in the schools is discussed. An explanation for this is drawn from brief historical examples that demonstrate the inherent conservatism of schools and teachers, the problem of integrating technology in the classroom, and the resistance of teachers to practices that present a perceived threat to good interpersonal relationships with students. In addition, contemporary criticisms are noted that help explain the diminished enthusiasm for computers in schools. Reference is made to disappointing research results on computers and student learning and development, and a summary assessment of the quality of software typically available for schools is presented. The paper concludes with a recommendation for the use of computers as a learning tool, emphasizing that computers should become meaningfully embedded in the curriculum and routine pedagogy of schools. (28 references) (Author/GL)

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COMPUTERS IN THE CLASSROOM: A STATUS REPORT

Presented at the summer
meeting of the Association
of Teacher Educators
Tacoma, Washington
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ABSTRACT

COMPUTERS IN THE CLASSROOM: A STATUS REPORT
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This paper discusses the current plateau in the use of computers in the schools. An explanation for this is drawn from brief historical examples that demonstrate the inherent conservatism of schools and teachers, the problem of integrating technology in the classroom, and the resistance of teachers to practices that present a perceived threat to good interpersonal relationships with students. In addition, contemporary criticisms are noted that help explain the diminished enthusiasm for computers in schools. Reference is made to disappointing research results on computers and student learning and development, and a summary assessment of the quality of software typically available for schools is presented. The paper concludes with a recommendation for the use of computers as a learning tool as the means by which computers can become meaningfully embedded the curriculum and routine pedagogy of schools.

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At the beginning of this decade, optimism about the potential benefits of the computer on teaching and learning was almost unrestrained. More recently, however, concerns about the inappropriate or counterproductive use of computers in schools have become pervasive. George Franz and Seymour Papert's 1988 comment is illustrative:

> An examination of computer use in schools today reveals that students' interactions with computers are largely teacher-directed, work-book oriented, for limited periods of time, and confined to learning abut the machines themselves or about programming languages. Further, computers are located in separate labs and are not integrated into the standard curriculum (Franz and Papert, 1988).

The editors of the Harvard Educational Review made a similiar observation in their introduction to a computers in the classroom symposium published in February, 1989: "Today, although computers are found in many calssrooms, they are often poorly integrated into classroom instruction, and many sit idle" (Symposium, 1989). The authors of one of the symposium articles offered a summary assessment that is both brief and accurate: "The period of rapid growth and great enthusiasm that heralded the introduction of computers in school has passed" (LCHC, 1989). The isolation of the computer from the routine curriculum and pedagogy of schools and the diminished enthusiasm for this technology generally

is somewhat ironic considering that computers are now available in 95 percent of all public schools (Valdez, 1986; Martin, 1986).

The ability to resist change has been well documented by those who study schooling in the United States. After more than 1,000 classroom visitations by his research team, John Goodlad reported in 1984 in A Place Called School on the lack of instructional variety in classrooms. Even though progressive educational rhetoric was the conventional wisdom of the first half of the twentieth century, and despite progressivism's resurgence through the humanistic education movement of the 1960's and early 1970's, teacher lecture and student seatwork remain dominant (Goodlad, 1984). Larry Cuban's recent historical study of teaching in twentieth century American schools substantiates the correctness of Goodlad's observations: even when pedagogical innovations were highly touted and strongly encouraged, they penetrated only a small percentage of classroom doors (Cuban, 1984).

As a follow up to that study, Cuban published Teachers and Machines in 1986, an historical account of the classroom use of technology since 1920. Here Cuban outlined the cycle of initial enthusiastic response, subsequent disappointment, and ultimate non-use of film, radio, and then television in the classroom. Cuban saw little evidence to suggest that the

computer will fare any better in schools than those earlier technologies (Cuban, 1986).

This is not to suggest that educators have already abandoned the computer. Even a brief review of current educational literature reveals enthusiasm on a variety of fronts: computers can assist the learning disabled, can make adaptive testing a reality, can serve as an instructional supervisory tool for principals with teachers, can reduce stereotyped but reinforced math and science inequities between girls and boys, and can lower dropout rates (Chisholm, 1987; McBride, 1985; Kuralt, 1987; Cole and Griffin, 1987; Gross 1989). Yet despite these specialized claims, the question remains whether the computer will assume a significant place in every day classroom life. On this issue, schools seem to be moving from the enthusiastic to the disappointment phase mentioned earlier. We can speculate on a variety of possible factors that have contributed to this diminished response to the use of computers in the school.

In the first place, schools traditionally have been conservative institutions, and those who are drawn to work in them do not typically value rapid change as a virtue. Even though computers have conquered other institutions, their widespread impact on the general public is quite recent. Recall, for example, how long it took for modern languages and vocational education to gain acceptance in the schools,

even though America emerged in the late nineteenth and early twentieth century as a pre-eminent industrial power. The inclusion of those subjects could have been seen as a logical corollary to that development and theoretically should have been accepted more readily.

Recall, too, that the enthusiasm for the common school in the mid-nineteenth century resulted in universally over-crowded classrooms, a condition that was exacerbated by the children of the new immigrants at the end of the century. Beyond the desire to enhance social discipline which permeated the campaign to promote schooling, nineteenth century teachers faced the real problem of maintaining control in a classroom environment that was stacked against them. Establishing a regimented classroom, literally making students "toe the line," was less mean spiritedness than an under- standable human response to a nearly impossible pedogogical situation. Formalism in the classroom has remained a value embedded in the teaching profession as a survival mechanism, and part of formalism requires that instruction be tightly controlled at all times. Technological innovations were not supposed to contribute to disorganization, but as a practical matter, teachers have often felt that they did just that. Arranging to view a television program precisely when the teacher wanted it

proved to be a problem too great to overcome. Similarly, the limited availability of computers frustrates teachers. As Seymour Papert, the inventor of Logo, remarked recently, if you wanted to teach children to write, and only brought eight pencils into the school, you would likely be disappointed with the results (Cox, 1987). A few computers for many students, or a special computer room somewhere in the building, is contrary to many teachers' view of the appropriate orderliness of instruction.

An opposite concern further complicates matters, namely, the nurturing strand that has always been present in some segments of the teaching profession. "Soft" pedagogy has been valued from the beginning, as seen in Horace Mann's adulation of Prussian teachers in the 1840's, and the popularity of Pestalozzian ideas following the Civil War. In the twentieth century, many factions in the progressive movement worked to gain acceptance for child centeredness as the preferred classroom orientation for teachers. For many teachers, then and now, methods that diminished the humaness of the classroom were regarded unfavorably. Recently, for example, teachers did write behavioral objectives when forced to, did not bother with them much if they could get away with it, and abandoned them all together when the fad became passe

in their district. Although Joseph Weizenbaum was referring to computers and psychotherapy, many teachers would agree that his comment that "respect, understanding, and love are not technical problems" was applicable to their field as well (Weizenbaum, 1976).

Larry Cuban framed the issue with this observation:

> Too often forgotten by policy makers intent upon transforming teaching practice is how much classroom learning is anchored in the emotional lives of thirty children and one teacher together for large chunks of time in a small crowded space.... The complex relationships between teachers and students become uncertain in the face of microcomputers.... Teachers gain pleasure from the emotional circuitry wired into intense bonds that develop between them and certain students, often lasting for decades.... In the fervent quest for precise rationality and technical efficiency, introducing to each classroom enough computers to tutor and drill children can dry up that emotional life.... (Cuban, 1986).

We have been analyzing the apparent decreased enthusiasm for computers in the schools and have suggested three probable explanations: (1) the inherent conservatism of schools and teachers, (2) the problem of integrating technology easily in the classroom, and (3), the resistance of teachers to practices that present a perceived threat to their interpersonal relationships with students. Another factor tempering enthusiasm may be the consequence of research findings. Evidence is beginning to emerge in

popular and professional journals suggesting that claims that computers have the power to change the way children learn, can produce higher level cognitive skills, and can influence positively psycho-social development, may have been over-stated (Papert, 1987; Hasselbring, 1986; Massialas and Papagiannis, 1987). At this early stage, it maybe premature to expect conclusive evidence, especially considering the current unevenness of computer availability and use. The neutral to negative findings reported thus far, however, are bound to restrain a resurgence of computer enthusiasm in the schools.

More than any other factor influencing the potential future of computers in the schools is the quality of the experiences educators and students have had with this technology. In The Second Self, Sherry Turkle portrays breathtaking computer-related accelerations in cognitive and psycho-social development. Her descriptions of individuals learning and growing in computer enriched educational environments are bound to make persons with teaching experience cheer. More ideal pedagogical and psychological outcomes are difficult to imagine (Turkle, 1984). But in more typical classrooms, the outcomes can be quite different. If a teacher is less than confidently prepared,

if there is only limited access to a computer lab, if students go there only to play video games or do drill and practice exercises, neither the allure nor consequences of a computer experience will be very favorable. Under these circumstances, students will be more passive than active, become bored quickly, and have little sense of the computer as a learning tool and an expressive medium (Trumbull, 1986). A social studies journal recently devoted an entire issue to the status of computer use in that discipline. The lead article described a major concern as follows:

> The most important thing to say about social studies microcomputer software is that it is now, and always has been, dominated by what is generally called drill and practice. Lists of early state capitals and multiple choice history questions have been replaced by fancier formats, more graphics, and especially more text, but the goal of the new social studies software remains what it was ten years ago: to transmit information via text and to ascertain the student's comprehension of the text by questioning (Budin, et.al., 1987).

Criticisms of content oriented software abound. Robert McClintock points out that the amount of information that must be put into a computer to equal even one substantial text is staggering. He calculated that the 88 disks advertised for the Apple II in a recent Sunburst Catalog total about 14 megabytes of code, which is about one-tenth of the information

contained in an ordinary high school course. This does not suggest, McClintock argued,

> that good courseware can be crafted solely from information content, any more than a good meal can be cooked from calories alone. It is to suggest that meals habitually prepared with only a small fraction of the calories that people normally consume will not be nourishing. So too courseware: If it is systematically deficient in information content, it will not nourish the minds of those who study with it, no matter how engaging the study proves to be (McClintock, 1986).

Like McClintock, Harold Shane supports the use of computers in education, but he too worries about some problems related to this technology, one of which he calls "the frozen curriculum." He is concerned that computers will simply substitute for drill workbooks, that software will be used without regard to individual differences, that teachers will become less involved in program development, and that hard and software will be kept in use longer than appropriate because of high acquisition costs (Shane, 1987).

Lastly, we call attention to Michael Streibel's extensive analysis of the drill and practice, tutorial, and simulation and programming approaches commonly used in schools. While believing that these approaches have some short term value, Streibel ultimately rejects them because

they are: (a) deterministic; (b) not genuinely individualistic; (c) associated with diminished sub-skill and higher level skill integration; (d) biased against experiential learning, quantum leaps in learning and reflective thinking; and (e) characterized by undue emphasis upon objective, quantitative and procedural intellectual tools at the expense of qualitative, non-technological ways of learning and thinking about problems. Streibel concluded that the gains associated with computer use exact a price that is too high (Streibel, 1986).

The problems currently associated with the use (or non-use) of computers in schools, and the criticism leveled at these practices are not impervious to change. Transitional periods in computer implementation can be envisioned. James Lengel writes persuasively that computer use in schools has gone through two stages: the personal stage, when one or two enthusiastic teachers who are computer competent use them effectively, and the diffusion stage, when the school district and teachers succumb to a variety of influences to insure that their schools and students have the machines and experiences everyone is talking about. Unfortunately, disinterest typically follows diffusion. Stage three, the tool stage, should be the goal for educators. It is a stage in

which the computer is not used for drill and practice, and is not an object of study in itself. Rather, it is a tool for learning, one that is naturally integrated into classroom like an "encyclopedia and the globe as a day-to-day instrument for teaching, used to enhance and assist in the accomplishment of traditional educational goals" (Lengel, 1986).

It will not be a simple matter to achieve this stage. Significant changes will have to occur in preservice and inservice teacher training (50 percent of all teachers have never used a personal computer for any purpose), and teachers and administrators will have to re-examine the institutional realities that foster teacher control over students working in isolation as an educational ideal (LaFrenz and Friedman, 1989; Cuban, 1989; Weir, 1989). Those are major issues that cannot be addressed here. What follows instead is an example of stage three development in a College of Education program that illustrates the curricular and pedagogical advantages of using the computer as a learning tool.

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